Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
SWE-DISH Satellite Communications, Inc.	)	File Nos.: SES-LIC-20030910-01236
	)	SES-AMD-20040116-0057
Application for Authority to Operate a Single Temporary-Fixed Earth Station in the Ku-Band Fixed-Satellite Service	)	Call Sign: E030197

ORDER AND AUTHORIZATION

Adopted: August 20, 2004 **Released: August 23, 2004**

By the Chief, Satellite Division, International Bureau:

I. INTRODUCTION

1. In this Order, we grant SWE-DISH Satellite Communications, Inc. ("SWE-DISH") a license to operate an elliptical 0.90X0.66 meter, transportable, transmit/receive, fixed-satellite-service (FSS) earth station, subject to conditions. The earth station will operate in portions of the Ku-band[1] and provide an Internet Protocol (IP) gateway using certain U.S.-licensed satellites for various services, including digital video news gathering, internet connections, broadband access, and other common and non-common carrier services. The earth station is designed to interface with numerous other electronic devices such as a portable computer, Moving Pictures Expert Group (MPEG) encoder and telephone interface to provide the telecommunications services listed above.

II. BACKGROUND

2. On September 10, 2003, SWE-DISH filed an application for a license to operate a single non-circular (elliptical) earth station with an antenna 0.90 x 0.66 meters in diameter that would transmit in conventional Ku-band (14.0-14.5 GHz) and receive in the conventional and extended Ku-band (10.95-12.75 GHz). The extended Ku-band at 10.95-11.7 GHz is allocated for international use only.[2] In addition, the 12.2-12.7 GHz band is not allocated for the Fixed-Satellite Service in the United States and 12.7-12.75 GHz is not allocated to the Fixed-Satellite Service in the space-to-earth direction.[3] SWE-DISH also requested authority to operate its earth station with all U.S.-licensed satellites ("ALSAT

[1] The "Ku-band" encompasses the frequencies in the 10 – 14 GHz range. The term "conventional Ku-band" refers to the 11.7-12.2 GHz (downlink) and 14.0-14.5 GHz (uplink) frequency bands. The term "extended Ku-band" refers to Ku-band frequencies outside the conventional Ku-band.

[2] *See* 47 C.F.R. §2.106, n. NG104.

[3] *See* 47 C.F.R. § 2.106.

status").[4] The SWE-DISH application was accepted for filing and placed on public notice on September 24, 2003.[5] PanAmSat Corporation ("PanAmSat") filed a Petition to Deny,[6] claiming that the earth station could cause interference into PanAmSat's operations if the earth station accessed any satellite adjacent to one of PanAmSat's satellites. AvL Technologies, Inc. (AvL) and TriPoint Global, Inc. (TriPoint) filed comments, asserting that SWE-DISH's proposed earth station does not meet the Commission's technical rules and will cause interference to adjacent satellite operations. After meeting with PanAmSat and other satellite operators, and revisiting frequency bands in which it seeks to communicate, SWE-DISH reduced the list of satellites with which it seeks to communicate and its proposed frequency bands to the following:[7]

Target Satellite	Satellite Operator	Target Satellite Nominal Orbital Position (W.L.)	Uplink Spectrum (GHz)	Downlink Spectrum (GHz)	Service
Telstar-11	Loral	37.5°	14.0-14.5	11.7-12.2	Domestic[8]
PAS-1R	PanAmSat	45°	14.0-14.5	10.95-11.20 11.45-11.7	International
AMC-5	SES Americom	79°	14.0-14.5	11.7-12.2	Domestic
AMC-3	SES Americom	87°	14.0-14.5	11.7-12.2	Domestic
Telstar-6	Loral	93°	14.0-14.5	11.7-12.2	Domestic
Galaxy-3C	PanAmSat	95°	14.0-14.5	11.7-12.2	Domestic

[4] SWE-DISH Satellite Communication, Inc., *Application for Earth Station License*, File No.: SES-LIC-20030910-01236, Call Sign: E030197 (filed Sep. 10, 2003) ("*SWE-DISH License Application*").

[5] Satellite Communications Services, RE: Satellite Radio Applications Accepted for Filing, *Public Notice*, Report No. SES-00535 (rel. Sep. 24, 2003), at page 4.

[6] SWE-DISH Satellite Communications, Inc., Application for Earth Station Authority in the Fixed Satellite Service, *Petition to Deny of PanAmSat Corporation*, File No. SES-LIC-20030910-01236 (Oct. 24, 2004).

[7] SWE-DISH Satellite Communication, Inc., *Minor Amendment to Application of SWE-DISH Satellite Communications, Inc.*, File Nos. SES-LIC-20030910-01236; SES-AMD-20040116-0057 (July 20, 2004). *See also* SWE-DISH Satellite Communication, Inc., *Clarification of SWE-DISH Satellite Communications, Inc.* File Nos.: SES-LIC-20030910-01236; SES-AMD-20040116-0057 (July 16, 2004) and SWE-DISH Satellite Communication, Inc., *Clarification of SWE-DISH Satellite Communications, Inc.* File Nos.: SES-LIC-20030910-01236; SES-AMD-20040116-0057 (July 21, 2004).

[8] We note that SWE-DISH only applied for domestic services in the conventional Ku-bands at 14.0-14.5 and 11.7-12.2 GHz. However, these bands are also available for purposes of communicating with international points. Therefore, while the scope of this authorization is limited to operation of the earth station within U.S. territory, the earth station is authorized to receive communications from and transmit to international points using the 14.0-14.5 and 11.7-12.2 GHz frequency bands.

PanAmSat subsequently conditionally withdrew its Petition to Deny.[9]

III. DISCUSSION

3. Under the Commission's rules, Ku-band earth stations with an equivalent diameter of less than 1.2 meters, such as the proposed SWE-DISH earth station, are not routinely licensed.[10] Instead, the Commission reviews such applications on a case-by-case basis to ensure that the earth station does not cause unacceptable levels of interference. To assist the Commission in making that determination, the applicant may provide either an analysis showing that no unacceptable interference will be caused or evidence that all potentially affected satellite operators have agreed to the proposed operations.

4. SWE-DISH reached agreement with each of the four U.S.-licensed satellite operators potentially affected by its proposed operation of its single earth station.[11] In particular, Loral Skynet, PanAmSat and SES Americom have agreed that, because of the occasional nature of the transmissions from the SWE-DISH earth station, they can support the grant of this application if the Commission incorporates the following conditions in the authorization:

a. "That the maximum uplink power density shall not exceed -16 dBW/4KHz."

b. "The SWE-DISH [earth station] shall not transmit until the target satellite operator has contacted the adjacent satellite operators to secure their approval of such operations. This will ensure that the proposed operations will not cause unacceptable interference to existing customer services. Operators shall negotiate in good faith to secure the necessary approvals for operation of the non-compliant antenna." [12]

Intelsat also has communicated its belief that operation of the SWE-DISH earth station up to an input power density of -14 dBW/4kHz would not cause unacceptable interference to its affected satellites.[13]

5. AvL argues that in order to ensure that the proposed non-conforming SWE-DISH earth station does not cause interference to adjacent satellite operations, the Commission should require SWE-DISH to file an amended application that demonstrates the following: (1) off-axis emissions directed at satellites uniformly spaced at 2° will not exceed the 15-29 log θ dBw/4kHz allowed by the Commission; (2) the antenna will always be tilted properly to align the 90cm axis of the SWE-DISH reflector with the orbital arc within reasonable limits, (3) the input power for the antenna is controlled to stay at or below the -14dBw/4kHz level allowed by the Commission; and (4) the antenna's pointing accuracy of $\pm 0.2°$ is achieved and maintained in 10m/sec (22 mph) winds (with a posted warning not to transmit with winds exceeding 20 mph).[14] TriPoint questions whether the earth station will create a radiation safety hazard

[9] SWE-DISH Satellite Communications, Inc., File No. SES-LIC-20030910-01236, *Conditional Withdrawal of Petition to Deny of PanAmSat Corporation* (filed January 26, 2004) (*PanAmSat Conditional Withdrawal*).

[10] 47 C.F.R. §25.212 (c).

[11] These were PamAmSat, Loral, SES Americom and Intelsat.

[12] See letter to Secretary, FCC, from Loral Skynet, PanAmSat and SES Americom, January 6, 2004

[13] See letter to Shahnaz Ghavami, FCC, from Intelsat, January 13, 2004.

[14] AvL Comments at p. 5.

because its operations will exceed the established safe limits for non-ionizing radiation (1 mW/cm2) by a factor of 400 at an input power of 12.1 watts.[15] TriPoint recommends that SWE-DISH should amend its application to include "the information needed for a reasoned analysis." Specifically, TriPoint wants SWE-DISH to provide in its amended application "measured antenna pattern data for angle increments of ~0.1 degrees, which is the norm for modern range data acquisition systems . . . SWE-DISH should provide the exact method used to ensure pointing accuracy. Absent extraordinary circumstances, this should be automatic or an operator should be required to be on duty."[16]

6. SWE-DISH states that AvL and TriPoint's comments are "completely without merit and appear intended mainly to impede the deployment of state-of-the-art transportable earth station technology in the United States."[17] SWE-DISH points out that both AvL and TriPoint are competitors to SWE-DISH. In response to claims of potential interference caused by the elliptical antenna and orbital arc deviations off of the main axis, SWE-DISH claims to have developed a tilting mechanism which can approximately align the major axis of the antenna with the geostationary orbital arc.[18] With regard to the issue of pointing accuracy, SWE-DISH claims that the earth station antenna and associated equipment already contain several features to ensure compliance with Commission requirements. First, "the high precision motor drive system allows the operator to adjust the antenna pointing in 0.1° steps from the graphical user interface (GUI)[19]. . . [second], SWE-DISH has had extensive wind tunnel tests conducted showing that, even at the operating wind speed of 10m/s, the deflection of the antenna in the azimuth plane will not exceed 0.1° for all wind directions."[20] In response to AvL's concern about whether the earth station's EIRP limits are determined by various data rates and FECs, SWE-DISH points out that the earth station "is fully integrated with a complete management system controlled by the GUI, which allows the operator to accurately control and monitor the transmit power level."[21]

7. Given that the operators of the target satellites as well as the operators of the potentially affected satellites have all agreed on the acceptability of the interference potential resulting from the operation of the SWE-DISH earth station under certain conditions, we will impose the requested conditions on the operation of this earth station. Thus, the interference concerns raised by AvL and TriPoint need not be addressed any further, leaving only the issue of radiation hazard to be considered. The Commission's rules define the maximum permissible exposure (MPE) to non-ionizing radiation for the general public in an uncontrolled environment in the 14.0-14.5 GHz band to be 1.0 mW/cm^2 for a period not exceeding 30 minutes. For individuals in a controlled occupational environment, the MPE is 5.0 mW/cm^2 for a period not exceeding 6 minutes.[22] SWE-DISH has provided a radiation hazard analysis

[15] TriPoint Reply Comments at p. 2.

[16] *Id.*

[17] SWE-DISH Opposition Comments at p. 2.

[18] *Id.* at p. 7. The earth station can be tilted in ten-degree increments, thus allowing the major axis of the antenna to be aligned to the geostationary satellite orbital arc within approximately five degrees.

[19] A graphical user interface ("GUI") is "[a] generic name for any computer interface that substitutes graphics for characters. GUIs usually work with a mouse or a trackball.") *See Newton's Telecom Dictionary,* CMP Books (18th Edit. 2002).

[20] SWE-Dish Opposition Comments at Attachment A.

[21] *Id.* at p. 8. SWE-DISH also acknowledges, in response to concerns raised by AvL in its Comments of October 24, 2003, that the product and performance specifications on its website are incorrect, and that the specifications contained in its Application before the Commission are accurate and "take precedence." *Id.*

[22] 47 C.F.R. § 1.1310.

indicating that these limits will be exceeded in the vicinity of the earth station for which license is sought.[23] In its Reply Comments, TriPoint highlights that the SWE-DISH analysis shows that the limit would be exceeded by a factor of more than 400 in the worst case.[24] The areas of possible excess exposure include the region directly in front of the main reflector, for some distance along the main beam of the antenna in the direction of the satellite, as well as behind and around the main reflector. The region of greatest possible exposure would be in the vicinity of the feed and the sub-reflector and in the spill-over region of the sub-reflector. We will require that the operator of the earth station assure that no individuals will be exposed to radiation levels beyond the MPE limits. In order to facilitate this we require that a label or labels be permanently placed on the earth station, warning about the radiation hazard and including a diagram showing the regions around the earth station where the levels could exceed 1.0 mW/cm^2. It shall be the responsibility of the earth station operator to keep individuals from straying within this region by means of signs, caution tape, verbal warnings, placement of the earth station so as to minimize access to the hazardous region, or any other appropriate means.

IV. CONCLUSION

8. We therefore grant SWE-DISH's application for a single temporary fixed earth station, subject to conditions.[25] We find that such grant will not create any unacceptable interference to adjacent satellite operations, as long as all of the conditions contained in this Order are met. SWE-DISH must apply for authorization to operate any additional units.

V. ORDERING CLAUSES

9. Accordingly, IT IS ORDERED that, pursuant to Sections 308, 309, and 310 of the Communications Act of 1934, as amended, 47 C.F.R. §§ 308, 309, 310, and Sections 25.115 and 25.121 (a) of the Commission's rules, 47 C.F.R. §§ 25.115 and 25.121 (a), the Application for Earth Station Authorization, File Nos. SES-LIC-20030910-01236, SES-AMD-20040116-0057, Call Sign E030197, IS GRANTED, and SWE-DISH Satellite Communications, Inc., IS AUTHORIZED to operate a single transportable terminal, subject to the following conditions:

a. The earth station's maximum uplink power density shall not exceed -16 dBW/4KHz.

b. The earth station will not transmit until the target satellite operator has contacted the adjacent satellite operators to secure their approval of such operations.

c. This authorization is limited to communications with 1) the Telstar-11 satellite at the 37.5° W.L. nominal orbital location in the 14.0-14.5 GHz (uplink) and 11.7-12.2 GHz (downlink) bands, 2) the AMC-5 satellite at the 79° W.L. orbital location in the 14.0-14.5 GHz (uplink) and 11.7-12.2 GHz (downlink) bands, 3) the AMC-3 satellite at the 87° W.L. orbital location in the 14.0-14.5 GHz (uplink) and 11.7-12.2 GHz (downlink) bands, 4) the Telstar-6 satellite at the 93° W.L. nominal orbital location

[23] *SWE-DISH License Application, supra*, at Attachment Exhibit D.

[24] TriPoint Reply Comments at p. 2.

[25] In the event SWE-DISH sells the antenna earth station for operations by another party, it must comply with the transfer of control provisions of the Commission's rules for satellite communications. *See, e.g.*, 47 C.F.R. § 25.119.

in the 14.0-14.5 GHz (uplink) and 11.7-12.2 GHz (downlink) bands, 5) the Galaxy-3C satellite at the 95° W.L. nominal orbital location in the 14.0-14.5 GHz (uplink) and 11.7-12.2 GHz (downlink) bands, and 6) the PAS 1R satellite at the 45° W.L. nominal orbital location, in the 14.0-14.5 GHz (uplink), 10.95-11.2 GHz (downlink) and 11.45-11.7 GHz (downlink) bands. Communications in the 10.95-11.2 GHz and the 11.45-11.7 GHz bands must originate from points outside the United States.

d. SWE-DISH shall take all reasonable and customary measures to ensure that the earth station does not create a potential for harmful non-ionizing radiation to persons who may be in the vicinity of the earth station when it is in operation. At a minimum, permanent warning label(s) shall be affixed to the earth station warning of the radiation hazard and including a diagram showing the regions around the earth station where the radiation levels could exceed 1.0 mW/cm^2. The operator of the earth station shall be responsible for assuring that individuals do not stray into the regions around the earth station where there is a potential for exceeding the maximum permissible exposure limits required by Section 1.1310 of our Rules, 47 C.F.R. § 1.1310. This shall be accomplished by means of signs, caution tape, verbal warnings, placement of the earth station so as to minimize access to the hazardous region and/or any other appropriate means.

e. In the event of a report of harmful interference resulting from the use of the earth station, SWE-DISH will immediately cease operations and inform the Commission.

f. Whenever the earth station is in use, a trained and competent operator must be physically present.

10. SWE-DISH is afforded thirty days to decline this authorization as conditioned. Failure to respond within this period will constitute formal acceptance of the authorization as conditioned.

11. This Order is issued pursuant to Section 0.261 of the Commission's rules, 47 C.F.R. § 0.261 and is effective upon release. Petitions for reconsideration under Section 1.106 or applications for review under Section 1.115 of the Commission's rules, 47 C.F.R. §§ 1.106 and 1.115, may be filed within 30 days of the date of the release of this Order.

FEDERAL COMMUNICATIONS COMMISSION

Thomas S. Tycz

Thomas S. Tycz
Chief, Satellite Division
International Bureau